AMATEUR SATELLITE REPORT

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AMSAT® NA *Newsletter for the Amateur Radio Space Program*

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Editorial...

"Launch of Six New OSCAR Satellites!"

By Dr. John Champa, K8OCL
AMSAT-NA Exec. Vice President

The future of the Amateur Radio Space Program, to a very considerable extent, is riding on the Ariane 4 that will successfully lift six new OSCAR satellites into orbit during this month. Regardless of the type of future satellite that most interests you, be it the geostationary no-tracking (Phase-IV-A/B Project) type satellites, the semi-geostationary Molniya orbiting high-powered OSCAR-10/13 (Phase-III-D) type satellite, or the very high flying deep space (Solar Sail Project) spacecraft, all will be significantly enhanced by the successful development of the MicroSats. It is doubtful that AMSAT-NA could seriously attempt to build a complex satellite such as a Phase-IV without the benefit of having first built the MicroSats. There's just too much technology to try to tackle at one time. It needs to be handled in manageable stages. The MicroSats provide a transition. Future MicroSats may be SSB/CW, digital voice, packet video, or whatever. The important factor is that the cornerstone technology has been achieved. With that in hand, AMSAT-NA can now move forward to other challenges.

What troubles me is that I still hear members ask, "Why MicroSat? I'm not interested in packet radio." That's shortsighted and entirely missing the point. But, maybe we haven't really explained things very well either! So, let's use an allegorical story.

The questions these members are asking is like saying, "When NASA wanted to go to the Moon, why didn't they just build a Saturn rocket and go there?" Well, first Dr. Goddard and others had to astound their neighbors with their rocket tests (as our associates were astounded by OSCAR-1, 2, 3, 4, 5). Then some really successful rocket designs had to become operational such as the German V2, and later, the Redstone and Atlas (OSCAR-6, 7, 8). And, they had their failures (Phase-III-A) and learning experiments (OSCAR-9, 10, 12), too. But when perfected, these rockets were absolutely beautiful and became the work horses of their day (OSCAR-11, 13). But, in spite of the fantastic nature of these machines, they were too simple or too small to take men to the Moon. What was needed was something much more sophisticated (MicroSats) and much larger (Phase-III-D and IV-A&B). If NASA had merely studied Dr. Goddard's or Dr. VonBraun's works, tried to skip over the intervening technological developments and then went directly into construction of a Saturn, I think you will agree, many heartaches and difficulties would have occurred. Such is the case with AMSAT-NA and the MicroSats. They are steps along the way that could not be jumped over — the risks to future projects would be too great. For these, and many other reasons, the MicroSats had to be built first.

This allegory only relates part of the story. There are expanding opportunities to launch small payloads into orbit. MicroSat gives the Amateur Radio Space Community a means to exploit those opportunities in a very effective manner, whether with SSB, CW, FM, FSK, AFSK, PSK, ATV, or whatever is desired or needed, for communications.

There is also a hope that the current MicroSats with their high-flying BBS capabilities will attract more members to AMSAT organizations around the world. It is obvious that

Ms. Lea C. Kuhn, AMSAT-NA Mathematician, assists members who are writing papers, texts, reports, or proposals for AMSAT publication, to ensure all calculations are clear and correct. (Photo by Pauline Champa)

we must have a much stronger financial support base if we are to build relatively large satellites such as Phase-III-D and IV-A/B.

As always, if you have any comments, please feel free to write to me at 7800 Hartwell Street, Dearborn, MI 48126-1122, or call (313) 584-2842.

DX'ing the OSCARs

By John Fail, KL7GRF/6

New/Interesting DX Stations recently Heard/Worked:

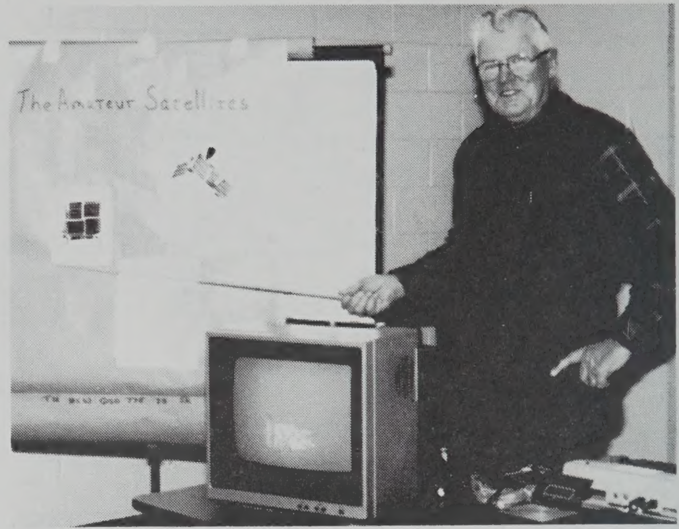
STATION	SATELLITE	MODE	QSL INFO
CT1AYF	AO-13	B SSB	Callbook/Bureau
P43TB	AO-13	B SSB	Bureau only - Not in callbook
P43AS	AO-13	B SSB	Juan Noguera Box 2380 Aruba
9M2CS	AO-13	B SSB	Callbook/Bureau
AL7BX	AO-13	B SSB	Box 284 Unalaska, AK 99685
4S7AVR	AO-13	B SSB	Callbook/Bureau
EA6SC	AO-13	B SSB	Callbook/Bureau
XT1FF	AO-13	B SSB	Via F6IGM (see DX notes)
6Y5HB	AO-13	B SSB	Callbook/Bureau
UT5BN	AO-13	B CW	Box 88 Moscow

DX Notes:

There has been some confusion about the callsign and QSL information for 6W1QA. Harold's call is now 6W1QB instead of 6W1QA. The QSL manager is still DB5PW, however, the address for DB5PW in the *1989 Callbook* is incorrect. The correct address is Augsberweg #60 vice Augsberweg #46 as indicated in the *Callbook*. It seems that YI1BGD uses several P.O. boxes, I still (as well as many others) do not have a card from YI1BGD but you might try Box 6100 in Baghdad, Iraq. S83H (Transkei) is now back on AO-13 but don't get excited about a new one. Transkei counts the same as South Africa for DXCC purposes. QSL to the *Callbook* address. Rare U.S. states heard: MAINE - KA1MVB, N1EFN; VERMONT - KA1FBJ. Several stations have worked Alan, GM1SZF, in Scotland but have found that his address is incorrect in the *Callbook*. The correct mailing address for GM1SZF is: Alan Harper, Fasberry Cottage, Hempriggs, Wick, Caithness KW1 5TP Scotland. Jean, TU4DA, will be returning to France from the Ivory Coast in June of 1990. You better work him while you can, he is active on Mode B and J. QSL TU4DA via F6FNU. The QSL cards for 9M6KT have now been ordered (11/27/89) so hopefully by the time you read this you will have a new one confirmed. The DXpedition to HI8 by KP4EKG was cancelled due to the effects of Hurricane Hugo, Tony still plans to make the trip in the near future, so stay tuned. There are now two very active stations from Aruba on the air. This is a result of Tony's operation from Aruba earlier this year. XT1FF caused quite a stir on Mode B on November 12th, he was also heard a week later on Mode J CW. He (Fred) is apparently fairly active on the weekends. The QSL manager for XT1FF is F6IGM, however, the address in the *1989 Callbook* for F6IGM is incorrect. The correct address is: Pascal Surbach, 3 Rue De La Boerie, Ferriere La Grande, F-59680 France. XX9KA is active on Mode B during most weekends as well as VS6VU.

Bouvet Island (and others?):

I had planned to feature information on use of the ARRL/AMSAT QSL bureaus this month but the upcoming Bouvet Island DXpedition needs to be expounded upon so I will cover the QSL bureaus next month. This expedition is scheduled for the first two weeks in February of 1990. Last month, I provided some detailed hints about working DX on the birds, in particular I detailed the necessity to "Listen, Listen, Listen". The Bouvet Island expedition is a classic case of where this is true. Bouvet Island is so far south that windows on OSCAR-13 with the Northern Hemisphere are very short. The Doppler effects of AO-13 will be very high for Chip (K7JA, the operator at Bouvet) since the Satellite is coming out of perigee at a very low altitude. Good operating habits must be observed if the maximum amount of stations are to work the island. Listen to Chip's instructions before you start calling. All importantly, "Don't find yourself or tune up on his downlink frequency," you will only cause QRM and slow things down. When contacting the Island exchange signal reports and get out of the pileup. Don't ask for QSL information, this is commonly available information on 145.890 MHz. (The QSL manager is WS9VGY, J. T. Pinella, 6316 Greenleaves Road, Indianapolis, Indiana 46220. Don't forget the SASE.) Remember, Chip "whistles" when he gets a callsign out of a pileup. When you hear him whistle, stop transmitting.



Les Peterson, W9YCV, Ass't Area Coordinator-WI giving satellite talk at Ozaukee Radio Club Meeting, Oct. 11, 1989. (Photo by W9YCV)

It appears the best windows for North America are in the early stages of the expedition (Feb. 1st through Feb. 4th). The weather in the area of Bouvet is very unpredictable. The expedition will depart Capetown, South Africa on about January 23, 1990 aboard an ocean-going salvage vessel. Chip and I will attempt communications via OSCAR-13 while the vessel is enroute to Bouvet. The expedition is scheduled to land on Bouvet about January 31st, however, the weather could preclude the landing for several days, therefore, delaying the on-air date. As of the date of this writing there is a strong possibility that this group will also operate from the South Sandwich Island group (VP8). The present plan is for the entire group (about 24 people) to land on Bouvet and operate for four days, several of the group will then depart for South Sandwich aboard the vessel leaving a crew behind on Bouvet to continue operation which includes a full OSCAR station at Bouvet. After a voyage of about four days the group landing at South Sandwich will operate for about nine days including via OSCAR. The group at South Sandwich will then depart for Bouvet and pick up the remaining personnel and proceed back to

Capetown. Keep an ear on 145.890 MHz for late-breaking developments as the expedition approaches the island(s). Chip plans to also try using OSCAR-10 (if available and not in eclipse), so keep an ear on OSCAR-10 during the expedition.

Upcoming OSCAR DXpeditions:

CE0Z (Juan Fernandez Islands Group — specifically Robinson Crusoe Island) by CE3BFZ and KL7GRF for seven days starting April 16, 1990 through April 24/25, 1990. The callsign was not available at this writing. For those of you who will be at the Dayton Hamvention, I will be stopping at the Dayton Hamvention on my return trip from the Island. I will have CE0Z QSL cards and logs with me so bring the date/time of your Satellite QSO with the island along with your QSL card and I will confirm the contact at the AMSAT booth in Dayton. If you can't make it to Dayton the QSL manager for Satellite contacts is VE6LQ. The QSL manager for six meter and hf contacts is CE3BFZ, Box 3159, Santiago 1, Chile.

KP5 (Desecheo Island) by KP4EKG early 1990. FY0EK (French Guiana) during MicroSat launch campaign in January. C6/DG1PJ (Bahamas) Dec. 15, 1989 through June, 1990, QSL to C6ANV. GD/GB8RRG, Isle of Man, (dates not certain) for four or five days. QSL to GB8RRG.

Next Time:

Information on the Juan Fernandez Islands DXpedition slated for April, 1990. Using the ARRL/AMSAT bureaus.

Thanks to all of you who have passed information to me in the mail and on the air for inclusion in this column. Space precludes listing all of you. If you have information on new DX stations on the birds, upcoming OSCAR DXpeditions or general DX info, send it to me at the below address or look for me on Mode B on 145.890 MHz or Mode J 435.960 MHz. Late-breaking DX information is often available from several DX'ers on Mode B 145.890 MHz.

Comments should be sent to John Fail, KL7GRF/6, 6170 Downey Avenue, Long Beach, CA 90805 U.S.A.

New Coordinator Positions Created Within AMSAT-NA

Courtney Duncan, N5BF, AMSAT Vice President for Operations announces the creation of two new types of positions within AMSAT-NA, those of Operational Coordinator and Technical Coordinator. These appointments parallel the Area Coordinator and Regional Coordinator positions which comprise the AMSAT Field Operations organization but have topical rather than geographical coverage. Operational and Technical Coordinators will report to the Vice President for Operations.

The new coordinators will provide an organizational focal point for activities in their areas of responsibility. As appropriate, they will provide assistance, "elmering," correspondence, and leadership to Amateurs who are interested in participating in these areas on a structured basis. This should help to provide direction and in some cases reduce duplication of effort among volunteers.

In many cases, the new appointments are acknowledgments of work that has already been going on for months or years and are made largely to inform AMSAT members generally about who is doing what. In other cases, appointments are intended to focus attention in areas that AMSAT wishes to develop more fully.

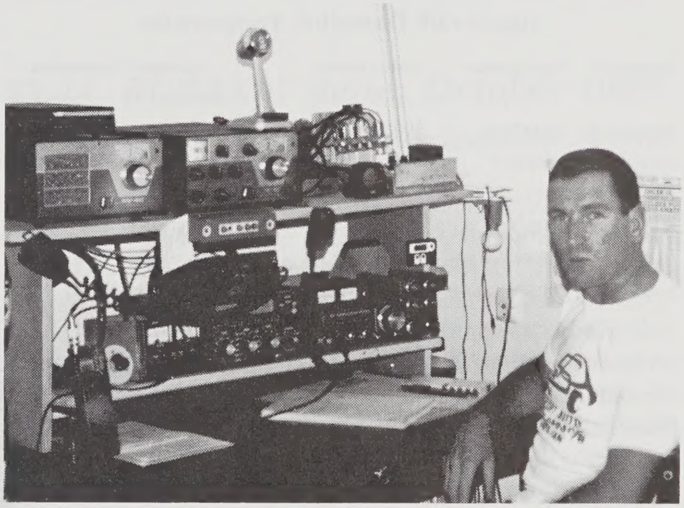
To date, the following new coordinators have been named:

Keith Berglund, WB5ZDP, Technical Coordinator for TechnoSports (SatFoxHunt and ZRO tests)

Bruce Rahn, WB9ANQ, Technical Coordinator for the Command Station Development Program

John Fail, KL7GRF/W6, Operational Coordinator for Satellite DX

Watch the AMSAT News Service and AMSAT-NA publications for notices of upcoming appointments and feel free to suggest additional areas in which a more organized approach of this type will be beneficial to AMSAT.



This is a well-known DX station on OSCAR-13, Jean, TU4DA, in the Ivory Coast. Jean will be returning to France in June 1990. Work him while you can.

KA1M Appointed Assistant Director, ANS

AMSAT-NA Vice President for Operations, Courtney Duncan, announces the appointment of Drew Deskur, KA1M, Assistant Director of the AMSAT News Service (ANS). Having recently completed a graduate degree, Drew cites a desire to make productive use of increased spare time among the many reasons for his return to regular AMSAT service in this role. He will be assisting ANS Director, Dave Cowdin, WD0HHU, in preparing weekly ANS bulletin releases.

The AMSAT News Service puts out abbreviated but timely news stories in support of AMSAT's national and international hf and vhf voice nets, electronic distribution on numerous land-line bulletin boards, and the worldwide packet radio bulletin board system. ANS is one of AMSAT's premier interfaces into the general Amateur Radio community.

Material for ANS may be submitted to Dave Cowdin, 8325 S. Yukon St., Littleton, CO 80123-6144; Drew Deskur, 19 Parker Dr., North Reading, MA 01864-3014, or AMSAT Headquarters, P. O. Box 27, Washington, DC 20044.

Getting Started With The MicroSats

By Dr. John Champa, K8OCL

The concept behind the development of the MicroSats was to keep operations as simple as possible for the users of these spacecraft, while maintaining a high degree of operational effectiveness. I think the volunteers in the project engineering team accomplished this objective, although it obviously was at the expense of spacecraft complexity. These are very sophisticated birds. Here are a few hints and kinks to help you get started on this new generation of Amateur Radio Satellites:

1. Listen! Listen! For the first few weeks after launch, ground command stations will be attempting to conduct tests and upload operational software. Please do not attempt to access any of the satellites (including the UoSAT). Do not transmit on any of the previously published uplink frequencies until authorized by AMSAT-NA Headquarters.

Spacecraft Downlink Frequencies

Spacecraft	*Organization*	*After Launch*	*Downlink Frequencies*	
			Primary	*Secondary*
MicroSat-A	AMSAT-NA	PACSAT-OSCAR-16	437.050 MHz	437.025 MHz
MicroSat-B	BRAMSAT	DOVE-OSCAR-17	145.825 MHz	145.825 MHz
MicroSat-C	CAST	WEBERSAT-OSCAR-18	437.100 MHz	437.075 MHz
MicroSat-D	AMSAT-LU	LUSAT-OSCAR-19	437.150 MHz	437.125 MHz
UoSAT-D	UoS/AMSAT-UK	UoSAT-OSCAR-14	435.070 MHz	435.070 MHz
UoSAT-E	UoS/AMSAT-UK	UoSAT-OSCAR-15	435.120 MHz	435.120 MHz

2. Plans call for WEBERSAT, LUSAT, and PACSAT turn on no sooner than 90 minutes and no later than 300 minutes after launch. DOVE will be kept off a little longer to avoid blocking the two-meter receivers of the other spacecraft with its 145.825 output. While full telemetry will be available, there will be no packet operation, no speech from DOVE, and no video from WEBERSAT. After the checkout period is complete (several weeks), each spacecraft will be loaded with flight application software. Every effort will be made to open the spacecraft for general use as soon as possible, but remember that these satellites are in a low Earth orbit (LEO), and the command stations will have about 40 minutes a day for checkout.

3. Once turned on, the DOVE will probably be the easiest downlink signal for most stations to monitor. The FM packets from DOVE may be copied with a standard TNC and two-meter FM receiver such as normally used for terrestrial packet operations, including the same omni-direction vertical antenna used by most two-meter packet stations! Don't bother building a turnstile or trying to track these satellites with beam antennas. It's not necessary, given the strong downlink signal from the MicroSats. But, remember, this is a satellite downlink frequency. Don't conduct terrestrial packet QSOs with a friend across town on 145.825 MHz! Move off to the normal terrestrial frequencies for such contacts.

4. Monitoring of the PSK signals from the other spacecraft will require a 70 cm SSB receiver and a TNC-2 modified with a 1200 baud PSK demodulator. The LUSAT CW beacon (437.125 MHz) transmits telemetry values in Morse Code using numeric characters.

It's hoped this brief introduction will help you enjoy this new mode of communication. Later AMSAT-NA publications will provide more detailed data, such as telemetry equations, operating techniques, and suggested equipment. In the interim, you may wish to read the excellent article on the MicroSats in *The AMSAT Journal,* Volume 12, Number 1, dated May, 1989, beginning on page 3.

MicroSat Antenna Discussion

By Courtney Duncan, N5BF
VP Operations

Drawing on previous studies of ground antennas for low Earth orbit satellites and operating experience, Dick Jansson, WD4FAB, has designed and theoretically analyzed performance of an antenna which is thought to be optimum for MicroSat work. Essentially, the antenna is a fixed, dual-band J pole with two feedlines.

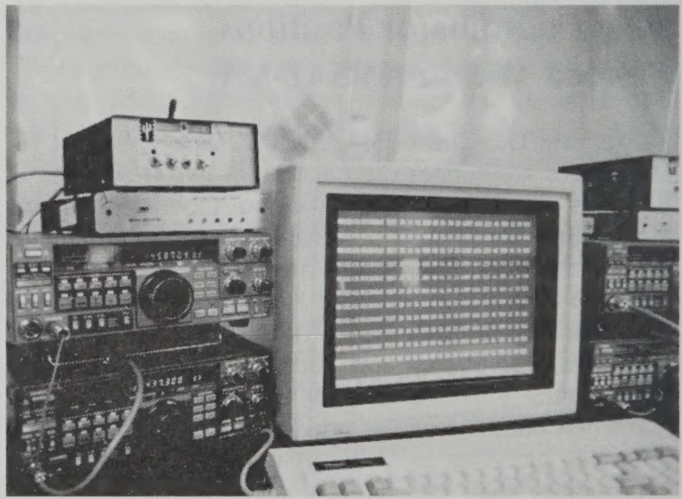
Details of the antenna design and analysis will be published in an early 1990 issue of *The AMSAT-NA Journal.*

Users of AO-13 class satellite stations using the gain antennas to track MicroSats will experience in some cases up to 50 dB of excess link margin. The nature of the PSK transmission mode from the PACSATs is such that excessive signal can actually make acquisition and demodulation more difficult. In any case, there is plenty of signal available to cover losses incurred from the use of fixed antennas and polarization mismatches.

MicroSat users, particularly those intending to set up automatic mail forwarding or data capture installations are encouraged to use fixed antennas to reduce automatic system maintenance and wear to a minimum. Automated ground stations requiring significant maintenance are likely not to be able to support much long term use.

For fixed antennas, Jansson recommends a vertical arrangement, such as the dual J-pole design, over turnstile-reflectors and other traditional horizontal or circular designs.

Simple vertical antenna radiation patterns closely match that required by low orbit satellites at various slant ranges



MicroSat testing is being facilitated by equipment donated by Kenwood, Heath Zenith Computers, MFJ, TAPR, Gateway Electronics of Denver, and assembled by Jim White, WD0E. One of the two complete PSK ground test stations is shown here in use at the AMSAT-NA Boulder, Colorado lab. (Photo by Jim White, WD0E)

and corresponding elevation angles. This is particularly true near the horizon where the most gain is needed and the satellites spend most of their visible time. The drawback is linear polarization, but MicroSat downlinks are circularly polarized so that the polarization mismatch is typically only three dB.

Turnstile-relector antenna response drops off near the horizon where it is most needed and has peaks at higher elevations where low orbit satellites spend relatively little time.

For further details and dual J-pole construction information, look for WD4FAB's article in the upcoming *AMSAT-NA Journal.*

MicroSat Tentative Keplerian Elements

This element set is valid for all the satellites but they will drift apart at the rate of several minutes in orbital position per week. Actual orbital element sets for each new satellite will be made available as soon as possible. Members should stay tuned to AMSAT Nets and the AMSAT News Service (ANS) Bulletins.

Satellite	**MicroSat/UoSAT**
Catalog Numbers:	Not yet assigned
Epoch Time:	90011.0816319
Element Set:	pre-launch
Inclination:	98.738 deg
RA of Node:	87.11413 deg
Eccentricity:	0.00134
Arg of Perigee:	110.95
Mean Anomaly:	297.18 deg
Mean Motion:	14.1988896 rev/day
Decay Rate:	1.0e-06 rev/day^2
Epoch Rev.	0

OSCAR-13, RUDAK-I Status October 1989

By Damian Schumacher, N5FVM

RUDAK-I *(Regenerativer Umsetzer* [transponder] *fur Digital Amateur-radio Kommunikation)* is the AX.25 protocol, digital packet repeater in OSCAR-13. RUDAK-I has never operated since launch because the 50 k-byte software program has never been uploaded. Until 15 October 1989, initiation of the on-board ROS (ROM Operating System including loader) appeared to stop at about 90 percent completion as indicated by a pattern in the RUDAK output (downlink). On October 15, 1989, the regular periodic attempt to initiate the ROS resulted in a different, "5050" output pattern, which indicated progress farther into the ROS initiation than any other attempt since launch but still not far enough to start the ROS.

This success precipitated intensified efforts to load the RUDAK processor via the IHU (OSCAR-13 Integrated Housekeeping Unit), bypassing the ROS. This caused changes in the OSCAR-13, B and JL operating schedule. In an effort to be brief and complete, a list of facts follows: First, a loading failure never occurred during pre-launch testing, making the determination of the current problem very difficult. Second, the RUDAK program only has to load correctly into OSCAR-13 once for indefinitely long operation. Third, RUDAK-I carries three bootstrap loaders, two using a different page-zero in memory and the third using the IHU of OSCAR-13.

AMSAT-DL prepared a high quality 150 page *RUDAK-I USER MANUAL* in English for their digipeater experiment. It will be published if and when RUDAK-I is operational. The manual explains packet digipeater's, Aloha access, link calculations, the RUDAK flight hardware, and has construction articles including appropriate modulator, demodulator, computer rotor interface, User Terminal and even a 20 watt, 24-cm power amplifier. Registered copies of the manual can be obtained "as is", in North America by sending $60 to N5FVM. Approximately $15 is needed for duplication of the manual and postage in the USA, and $45 will be used by AMSAT-DL for future satellite construction and launch fees. The manual will be updated as soon as RUDAK-II is operational, and with the larger user community, the manual can be sold much cheaper than today.

RS-14, RUDAK-II Status, October 1989

By Damian Schumacher, N5FVM

The AMSAT-DL RUDAK group in Germany is building RUDAK-II, scheduled for December 1989 delivery to the USSR, and launch later in the RS-14 satellite. The final PC boards are being etched. The digital part of RUDAK-II consists of roughly five boards. One is the RUDAK-I processor modified for operation without the O-13 IHU. Second is a second processor for communications. Third is a shared, one megabyte RAM "disk" memory for the two processors. Fourth is a hard-wired command decoder with initializer and the four receiver inputs. Fifth is a power conditioner and switch, and telemetry interface. The four 1200 to 9600 bit/sec uplink frequencies are planned between 435.000 MHz and 435.180 MHz, with one 1200 bit/sec downlink at 145.990 MHz.

The above information was obtained during a visit with the project manager for the RUDAK experiment, Hanspeter Kuhlen, DK1YQ. I would like to thank DK1YQ and DF2IR for their time and the tour of the famous Water Tower. The tower is in the city of Ismaning, five miles north of Munich, near the Munich airport. The Water Tower is the location of the DL0ISM club station, and the RUDAK-I prototype repeater. Two RS-14 Satellite Command Simulators are complete, and the complete RUDAK-II prototype will also be assembled in the Water Tower. Let us all hope for the success of both RUDAK systems, and thank the Munich group for the sacrifice of all their free time for months in the effort to launch the RUDAK experiments for us all.

Fund Raiser Rocket!

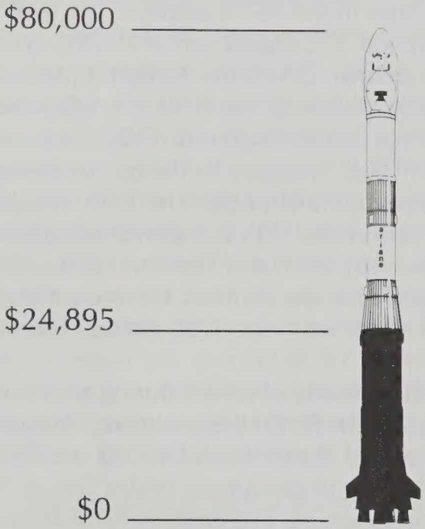
If AMSAT members are going to have access to an Amateur Radio Geostationary Satellite, many more of us are going to have to dig a lot deeper into our pockets to make it happen. Even if a government or corporate sponsor steps forward to help finance a Phase-IV series of satellites, our organization will still have to foot a substantial portion of the expense, Please help with your donation. If you are unable to handle a large donation at this time, then pledge $10 to $20 a month, but please help! If desired, you may earmark your contribution for the particular project of your choice, e.g. Phase-III, Phase-IV, Solar Sail, or MicroSat. Send your contribution today, to AMSAT, P.O. Box 27, Washington, DC 20044.

Another way in which you can personally help advance the Amateur Radio Space Program is to recruit new members to AMSAT and encourage past members to renew. Tell them about all that is happening within the world of OSCAR satellites, our improved publications, and the expanded hf, vhf, uhf, and satellite nets. If you've worked OSCAR-13, tell them about the fantastic new DX that is appearing on the satellite almost daily, and about the upcoming DXpeditions which will be equipped with Amateur satellite gear.

Special appreciation and recognition goes out to the following contributors for their generous and continued financial support:

Birger Lindholm of Finland	$150
Frank Maynard, VK4RY	$150

If we missed your name, please pardon the omission. Just let us know and we'll add it to the next listing of contributors.



Short Bursts

• According to Courtney Duncan, N5BF, AMSAT-NA Vice President-Operations, our contacts in Japan have indicated that the current launch window for the JAS-1B Amateur Radio Satellite Project is February 1, 1990 (0125-0200 GMT). The JAS-1B will have the same mission assignment as Fuji-OSCAR-12 i.e., Mode JA (SSB and CW) and Mode JD (PACSAT). Recently it was necessary to suspend further Fuji-OSCAR-12 operations when the power budget problems it had experienced became too severe. The primary payload for the launch will be the MOS-2 satellite to be used for marine purposes. The AMSAT launch information nets will be activated for the second month in a row, to cover the exciting events around this launch. Stay tuned to the AMSAT hf, vhf, uhf and satellite nets for further details. The next issue of *The AMSAT Journal* will contain a complete description of the JAS-1B spacecraft.

• The volume of reception reports for recent "ZRO" Tests have been fantastic, according to Andy MacAllister, WA5ZIB, AMSAT-NA Vice President-User Services. Most reports have been from the U.S. and Western Europe. Many stations have upgraded their equipment for better reception with subsequently improved results on the "ZRO" runs. *Editor's Note:* Information regarding typical equipment configurations used to achieve the Z-9 level is provided in *ASR 190,* September 15, 1989, page 11.) Additional stations have now joined the prestigious "Z-9 Club" with perfect copy of the secret number groups to a level 27 dB below the beacon signal on AMSAT-OSCAR-13! Jeff, W7ID, has qualified as the first to copy Z-9 levels on both Mode B and JL. Andy states that if you sent a report or certificate request, expect a reply before the end of January.

• The American Radio Relay League has indicated that their first book on microwaves is about to be published. The book is in two parts. Editing on volume one, covering mainly theory, is nearly completed. It may be available as early as the first quarter of 1990. Volume two, construction projects, will follow later in the year. Also, the 1990 edition of the *ARRL Radio Amateur's Handbook* became available at the end of last year. It features substantial updates to the Space Communications chapter. Either of these publications would be helpful to operations in the Amateur Satellite Service. For further information write to ARRL, 225 Main Street, Newington, CT 06111 or call them at (203) 666-1541. They accept most major credit cards, including American Express.

• The AMSAT-NA 75-Meter East Coast Net has been conducted every week for many years. It is considered by many members to be the "backbone" of AMSAT-NA hf net operations. The new net control station (NCS) is operated by Ron Long, W8GUS, and he has announced some new procedures for the Tuesday evening net. The formal portion of the net will begin promptly at 9 p.m. Eastern with the net preamble and the reading of the AMSAT-NA News Service (ANS) Bulletins. This will be followed by satellite DX news and hints and kinks items. Next, an opportunity for comments will be provided for any AMSAT officers or engineering team members who are on frequency (3.84 MHz). The most current available Keplerian element set for tracking satellites of interest to members will be read on a request basis. Because of the large geographic area covered and the considerable numbers of members served by this net, there will be two periods for accepting check-ins. The first will be from 8:30 to 9:00 p.m. The second check-in period will follow the formal part of the net from approximately 9:40 to 10:00 p.m. During these periods Ron will greet members and take comments and questions. If you would like to discuss the net operation with Ron off-the-air, he can be reached at 1516 Essex Road, Columbus, OH 43221, or telephone him at (614) 486-5746. He can also be reached via packet at W8GUS @ W8CQK, or via Telemail at RONLONG.

- Keith Berglund, WB5ZDP, the author of the very popular AMSAT-NA booklet, *The Beginner's Guide to OSCAR-13,* is now writing a column titled "Amateur Satellites". The first installment appeared in the December, 1989 issue of *Worldradio Magazine* (pages 59-60) and it was excellent. It is written in Keith's usual easy-to-understand and light-hearted manner. For monthly subscription information contact *Worldradio*, 1779 Tribute Road, Suite L, Sacramento, CA 95815 or telephone 1-800-365-SUBS.

- The following information regarding the current AMSAT-OSCAR-13 (AO-13) transponder schedule is provided by our colleagues in AMSAT-DL:

Mode B	MA 000 to MA 110	
Mode JL	MA 110 to MA 145	
OFF	MA 145 to MA 150	BAHN LAT – 1.8
S Beacon	MA 146 to MA 147	BAHN LON 179.8
Mode S	MA 147 to MA 160	
Mode B	MA 150 to MA 255	
Omni Ant	MA 225 to MA 035 (perigee)	

- AMSAT-OSCAR-10 (AO-10) is currently available for whole orbit operation via the Mode B transponder.

Editor's Note: Since the attitude of this spacecraft can no longer be controlled, users will not experience uniform operating characteristics from this spacecraft. AO-10 present estimated attitude is ALON 38 degrees, ALAT – 17 degrees (Thanks, G3RUH).

- As this issue of *ASR* went to press word was received from Peter, DB2OS, via Dick Jansson, WB4FAB, that it is possible that RS-14 containing the RUDAK-II might be launched in March, 1990! In case you have gotten a little confused because of all the Amateur Satellite Service launches, here is a recap of the planned events (subject to change, of course):

January, 1990	MicroSats A, B, C, D and UoSATs D & E
February 1, 1990	JAS-1B (Mode J and PACSAT)
March 7, 1990	RS-14 (Mode B and RUDAK-II)
April 26, 1990	STS-35/SAREX (FM Voice and Packet)
June 4, 1990	STS-37/SAREX (FM, Packet, SSTV, ATV)

- Dr. Karl Meinzer, President, AMSAT-DL, has informed AMSAT-NA that partial funding support has been received from the government towards construction of the Phase-III-D Project. It is hoped that "...during the next four or five years..." this proposed spacecraft would be placed in an orbit similar to OSCAR-13. Among other features, this spacecraft would have a 10 to 15 dB improvement in the link performance over the current generation of Phase-III satellites. This would allow smaller, less sophiscated, and lower powered ground stations to communicate through its transponder(s). Southern Africa AMSAT (SA AMSAT) has expressed interest in placing a high power Mode A communications transponder aboard the spacecraft for educational purposes and to conduct propagation studies. AMSAT-DL is presently negotiating with the European Space Agency (ESA) concerning the possibility of a launch on one of the early Ariane 5 test launches. It is Dr. Meinzer's hope that AMSAT organizations worldwide will team their efforts in the accomplishment of this project.

- There is a small quantity remaining of the beautiful and colorful MicroSat Patches. This is the Official AMSAT-NA MicroSat Mission Patch similar in design to the large decal to be affixed to the side of the launch vehicle. While the supply lasts, they will be available on a first-come, first-serve basis in return for a $5 donation to AMSAT-NA.

- Martha Saragovitz, Circulation Director for AMSAT-NA publications, wishes to remind AMSAT-NA Life Members residing outside of the US that they can receive the *ASR* and *The AMSAT Journal* via air mail by remitting $15 (U.S.) for one year.

- Looking for something to do between satellite passes? There are two books which satellite enthusiasts will find fascinating reading! The first of these recommended books is a novel by Dale Brown. Mr. Brown is the author of the popular aviation adventure, *Flight of The Old Dog.* In his most recent book titled *Silver Tower* (New York: Berkley Publishing Co., 1989) he tells about adventures aboard a future space station. If nonfiction is more to your taste, then you should read *Deep Black — The Startling Truth Behind America's Top-Secret Spy Satellites* (New York: Berkley Publishing Co., 1988) by William E. Burrows. Find out what the Discovery Series of satellites were really discovering! Enjoy.

- Reminder — if your membership expiration date was December, 1989, this is your last publication from AMSAT unless you renew your membership. Call Martha Saragovitz at AMSAT Headquarters at 301-589-6062 to renew now.

InstantTrack 1.00 Now Available for IBM-PC

By Franklin Antonio, N6NKF

InstantTrack is a new satellite tracking program for Radio Amateurs, written by Franklin Antonio, N6NKF. It provides all the features of the tracking software you use now, and many you've only dreamed about. See the review in the November '89 issue of *73* magazine. Many of IT's best features involve the way that the user interacts with IT, and these are, of course, difficult to describe in writing. Nevertheless, here is a short summary:

Speed — InstantTrack is faster than any other tracking program period. Humans should never wait for computers.

Ease of Use — Most commands are a single keystroke. Usually tedious functions are fully automated.

Instant Visibility — InstantTrack shows you the positions of your favorite satellites, even before you issue the first keystroke. The menu of 200 satellites shows you which are visible from your location even before you select a satellite. The menu of 1754 cities shows you which cities are visible from the selected satellite even before you select one.

Real-Time Displays — InstantTrack displays all the information you will normally need to operate with any satellite on its real-time display screens. Information includes: Azimuth, Elevation, Range, Doppler, Path Loss, Squint, (all shown for multiple observers) Sub-satellite point expressed as Lat/Lon, Gridsquare, and Nearest-City, Cartesian Coordinates of Observer and Satellite, Satellite Rise/Set Time, Satellite Mode, Right-Ascension, Declination, Sky Temperature, and more.

Graphics — InstantTrack displays full color high resolution (EGA/VGA) maps of the Earth, showing satellite and observers position, two kinds of satellite footprint, grayline, etc. (Map projection is selectable.) Users can also select either a diagram of the satellite's orbit showing orientation of the satellite, or a map of the sky, showing the satellite's position against the field of stars. You can move from map to map or satellite to satellite with a single keystroke, instantly.

Automated Orbital Element Entry — InstantTrack reads the popular NASA and AMSAT format satellite element files and updates its database automatically. You need never again manually enter dozens of 10 digit numbers.

Automated Time Setting — InstantTrack automatically sets time on your computer by accessing the NIST (formerly NBS) time service via your modem.

Satellite & Station Database — InstantTrack supports a database of 200 satellites and 50 observer locations. A unique grouping feature allows you to categorize satellites, and perform most operations on either a selected group, or the entire database.

City Database — InstantTrack includes a database of 1754 cities worldwide. Locations of the satellite (sub-satellite points) and observers are displayed relative to the nearest city! Observing stations can be specified by entering as little as their city name!

Grid Squares — InstantTrack understands the gridsquare system. Observing stations can be specified by typing only their gridsquare.

Satellite Covisibility — InstantTrack shows you when satellites can see other satellites (i.e. when crosslinks are possible), when satellites are in eclipse (in the shadow of the Earth). This display, of course, updates in real-time, so you can see crosslinks appear and disappear.

Squint Angle — InstantTrack computes the angle by which the satellite's antennas are pointed away from you. Helps you understand why quality of communications via satellites such as OSCAR-10 and OSCAR-13 (spin-stabilized satellites with directional antennas) varies. InstantTrack's graphics show you where a satellite's antennas are pointing. Maps display a contour line of squint angle. Stations within this line have low squint, and can establish the best links via such satellites.

Path Loss — InstantTrack shows the path loss between observers and the satellite in realtime.

Schedules — InstantTrack can show you the next three weeks schedule for a satellite, or one day's schedule for twenty satellites on one easy-to-read screen.

Realtime Rotor Control — InstantTrack supports realtime antenna rotor control via the Kansas-City-Tracker interface.

Background Mode — A unique background mode allows you to track satellites and point antennas in real-time while you run other programs.

Sun and Moon — InstantTrack tracks the Sun and Moon as well as the satellites in its database.

Fast Rise-Time Finder — InstantTrack computes the time at which a satellite will rise over the horizon without the usual delay caused by stepping through small time increments between now and then.

Tracking Multiple Stations — You can see the computed parameters (azimuth, elevation, squint) both from your perspective and from the perspective of the station at the other end of the satellite link.

Documentation — InstantTrack comes with documentation which is both Extensive and Tutorial.

Online Help — InstantTrack contains an online help facility which can be entered from almost any screen.

Availability

InstantTrack is available from The Radio Amateur Satellite Corporation, AMSAT-NA for $50 per copy ($70 if you're not a member) for individuals and non-profit organizations. Commercial users please call for price info.

AMSAT-NA is a non-profit organization which builds and launches Amateur Radio satellites. The author is a member of AMSAT, but has no financial affiliation. If you buy a copy of InstantTrack from AMSAT, the entire purchase price goes toward the Amateur Radio space program. Contact AMSAT-NA, P. O. Box 27, Washington, DC 20044 or telephone (301) 589-6062

Required Hardware

Any IBC, or AT, PS2, clone, etc. with at least 512k memory. Any display type is okay for the text mode screens, but VGA preferred. Graphics screens require EGA or VGA display. A numeric coprocessor (8087 or 80287) is not required, but it is recommended. A mouse is not required, but can be used on the map screens.

AMSAT® NA

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